



# 2014 ANNUAL



## PROGRAM REPORT



### ANASTASIA MOSQUITO CONTROL DISTRICT OF ST. JOHNS COUNTY

500 Old Beach Road  
St. Augustine, FL 32080



[www.amcdsjc.org](http://www.amcdsjc.org)  
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# PREFACE

## A MESSAGE FROM THE DIRECTOR



There was a mosquito population outbreak in southern St. Johns County in early October due to heavy rainfall in late September. In 2014, 80 sentinel chickens tested positive for WNV (48), EEE (24), HJ(7), & Alphavirus (1). One blood donor in St. Johns County tested positive for WNV and there were three imported human cases of Chikungunya in St. Johns County in 2014.

AMCD & USDA/CMAVE successfully organized the 11th Arbovirus Surveillance and Mosquito Control Workshop and provided 20 CEU credits, organized AMCA's symposium on Vegetation Management for Control of Mosquitoes, Seattle, WA, February 2-6, 2014, co-organized SOVE's symposium on Behavioral Ecology, San Antonio, TX, September 28-October 2, 2014, and hosted the Florida Coordinating Council on Mosquito Control meeting on February 11, 2014. AMCD trained 5 intern students and cooperated with the University of Florida to train a Ph.D. student. AMCD also cooperated with UF and USF to conduct DACS grants for "Attractive Toxic Sugar Bait's Impact on Honey Bees" and "Honey Card for Virus Detection".

Mr. David Taylor, Supervisor of the North and South Stations and Greg Griggs, Mosquito Control Technician from the Base Station retired in July after 20-23 years of service for the District. I was elected as the Vice-President of the Florida Entomological Society at the annual meeting, Jupiter, FL, August 3-6, 2014, appointed as the SOVE's Southeastern Regional Director in September 2014, and received the Florida Mosquito Control Association's (FMCA) merit award and elected as the Vice-President by the FMCA members. Commissioner Moeller was also elected as the FMCA's Commissioner section's Chair during the annual meeting in Weston, Florida, November 9-12, 2014.

I do appreciate and thank the Board, all employees, colleagues, citizens, contractors and cooperating agencies and personnel for their support and service to AMCD's programs.

## A MESSAGE FROM THE CHAIRPERSON



Thank you to all of our dedicated employees and colleagues for all of their hard work, along with the support from the Board of Commissioners, and to the residents of St. Johns County and other cooperating organizations for their support to keep our citizens and tourists free from mosquito-borne diseases in the past years. Also, thank you to all citizens that re-elected me and Mrs. Jeanne Moeller as the Commissioners to serve the Board for another 4 years. The Board of Commissioners in 2014 sold the Ponte Vedra Property and approved the building of a new facility to relocate the existing Base Station facility and awarded the RFP to build it to Harrell Construction.

### **BOARD OF COMMISSIONERS:**

Mrs. Catherine Brandhorst, Chairperson  
Mrs. Vivian Browning, Vice Chairperson  
Mr. Gary Howell, Secretary/Treasurer  
Ms. Janice Bequette, Commissioner  
Mrs. Jeanne Moeller, Commissioner

### **APPOINTED OFFICERS BY THE BOARD:**

Dr. Rui-De Xue, Director;  
Mr. Wayne Flowers, District Attorney;  
Ms. Julieann Klein, CPA





# PERSONNEL

## ADMINISTRATION

## HIRE DATE

Dr. Rui-de Xue, Director	4/14/03
Charolette M. Hall, Administrative Assistant	11/5/07
Scott Hanna, Accountant	7/9/07
Jodi Scott, Ed. Specialist	8/13/12 - 5/30/14
Christopher Bibbs , Education Specialist	6/2/14



Kay Gaines, Supervisor 8/7/00

## BASE STATION

### Mosquito Control Technicians

Ken Daniel	9/26/05
Tom Downey	3/1/06
Greg Griggs	4/15/91 – 6/30/14
Cathy Hendricks	7/8/02
Ricky Stockley	2/4/13
David Strickland	3/10/97
James Wynn, Mechanic	3/4/96

David Taylor, Supervisor 2/28/94 – 6/20/14

## NORTH STATION

### Mosquito Control Technicians

Freddie Allen	7/8/02
Ryan Grubbs	2/4/13 to 9/26/14
Vincent Price	6/1/99
Elaine Scanzani	3/20/02
Steven Solana	4/24/00
Michael Vaughn	3/3/14

## SOUTH STATION

### Mosquito Control Technicians

Patrick Kendrick	4/7/03
Barry Scott	3/3/14

## ENTOMOLOGY DEPT.

## HIRE DATE

Alice Fulcher, Biologist	1/7/13 -11/28/14
Mike Smith, Biological Technician	11/5/84
Jennifer Gibson, Biological Technician	10-20-14
Emily Thomson, Biological Technician	10-20-14
Richard Weaver, Data Manager	4/14/03
Jodi Scott, Visiting Scientist/Ph.D. Student	6/1/14

## SEASONAL -

### Full Time (6 Months)

## HIRE DATE

Dena Autry	5/5/14-10/31/14
James Deadwyler	5/5/14-10/31/14
Michael Geiger	5/5/14-10/31/14
Jerry Iser	5/5/14-10/31/14
Keaton Lofton	5/5/14-10/31/14
John McClure	5/5/14-10/31/14
Peter Miele	5/5/14-10/31/14
Stephen Steele	5/5/14-10/31/14
Dan Verfurth	5/5/14-10/31/14

## INTERNS & VOLUNTEERS

Codi Anderson	5/19/14 – 8/15/14
Derrick Conover	5/19/14 – 10/31/14
Jennifer Gibson	2/25/14 -4/25/14 & 9/2/14 - 10/17/14
Kelley Seeger	5/19/14 – 8/15/14
Emily Thomson	1/7/14 – 5/30/14 & 7/7/14 – 10/17/14





## COMMITTEE MEMBERS 2014

### SAFETY COMMITTEE:

**Safety Coordinator:** Mr. Richard Weaver,  
(Chair)

**Supervisor:** Mrs. Kay Gaines

**Employees:** Mr. Ken Daniel, Mr. Ricky Stockley; Mr. Vincent Price; Mr. John "Freddie" Allen, & Mr. Steven Solana

### APPLIED RESEARCH COMMITTEE:

**Commissioner:** Ms. Janice Bequette  
(Chair)

**Biologist:** Mrs. Alice Fulcher (through 11/28/14)

**Biological Technician:** Ms. Jennifer Gibson,  
Ms. Emily Thomson (both beginning 10/20/14)

**Data Manager:** Mr. Richard Weaver

**Biological Technician:** Mr. Mike Smith

**Education Specialist:** Ms. Jodi Scott  
(through 5/30/14) & Christopher Bibbs  
(beginning 6/2/14)

### EDUCATION COMMITTEE:

**Commissioner:** Mrs. Jeanne Moeller, (Chair)

**Education Specialist:** Ms. Jodi Scott (through  
5/30/14), Christopher Bibbs (beginning 6/2/14)

**Supervisor:** Mrs. Kay Gaines

**Biologist:** Mrs. Alice Fulcher (through  
11/28/14)

**Biological Technician:** Ms. Jennifer Gibson,  
Ms. Emily Thomson (both beginning 10/20/14)

**Employees:** Mr. Patrick Kendrick,  
Mr. Vincent Price, Mr. Steven Solana

### PLANNING COMMITTEE:

**Commissioner:** Ms. Vivian Browning, (Chair)

**Director:** Dr. Rui-De Xue

**Supervisor:** Mrs. Kay Gaines

**Data Manager:** Mr. Richard Weaver

**Biologist:** Mrs. Alice Fulcher (through 11/28/14)

**Biological Technician:**  
Ms. Jennifer Gibson (beginning 10/20/14)



### FINANCIAL / AUDITOR COMMITTEE:

**Commissioner:** Ms. Catherine  
Brandhorst, (Chair)

**Accountant:** Mr. Scott Hanna

**Director:** Dr. Rui-De Xue

**Supervisor:** Mr. David Taylor  
(through 6/20/14)

**Administrative Assistant:**

Ms. Charolette M. Hall

### DISASTER PREPAREDNESS COMMITTEE:

**Supervisor:** Mrs. Kay Gaines

**Data Manager:** Mr. Richard Weaver,

**Biologist:** Mrs. Alice Fulcher,  
(through 11/28/14)

**Biological Technician:**

Ms. Jennifer Gibson  
(beginning 10/20/14)

**Supervisor:** Mr. David Taylor (6/20/14)

**Education Specialist:**

Ms. Jodi Scott (through 5/30/14) and  
Christopher Bibbs (beginning 6/2/14)

### OPERATIONAL COMMITTEE:

#### GROUND/AERIAL

**Commissioner:** Mr. Gary Howell (Chair)

**Director:** Dr. Rui-De Xue

**Data Manager:** Mr. Richard Weaver

**Biological Technician:** Mr. Mike Smith

**Supervisors:** Mrs. Kay Gaines,  
Mr. David Taylor (through 6/20/14)



## **PROGRAM OVERVIEW:**

### **AMCD MISSION, VALUES, VISION, and PROGRAMS**

#### **OUR MISSION:**

To protect all people from the nuisance of mosquitoes and mosquito-borne diseases in St. Johns County, Florida.

#### **OUR VALUES:**

Service Driven, Scientific Based, Professional, Justified, Environmentally-friendly, Collaborative, Compassionate, Accountable, and Sustainable Excellence.

#### **OUR VISION:**

AMCD of St. Johns County will be among the leading Districts for mosquito control and the people in St. Johns County will be among the healthiest in the nation – a well served community, enjoyed by all and supported by all partners.

#### **OUR PROGRAMS:**

Customer Service, Operations (including Surveillance and Control), Education, and Applied Research.

The AMCD staff, located in three stations in St. Johns County (Base, North, and South Stations) provide the following services:

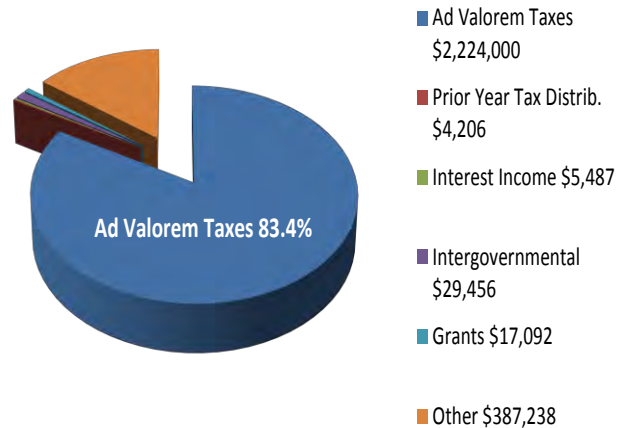


Conduct inspections and mosquito control; work with local organizations, schools, homeowners associations, etc. on public education to minimize the impact of mosquitoes on the St. Johns County residents; conduct surveillance continually to help reduce the mosquito population, to reduce the chance of human virus association, and to protect the environment; do larvaciding and adultciding as needed, especially during the season from March through November; provide education to the community, schools, and associations, to better inform our public and to assist them in helping control the mosquito population; do applied research to test ideas and products, to help reduce the mosquito population; provide employee training to keep up with modern equipment and methods in the control of mosquitoes.

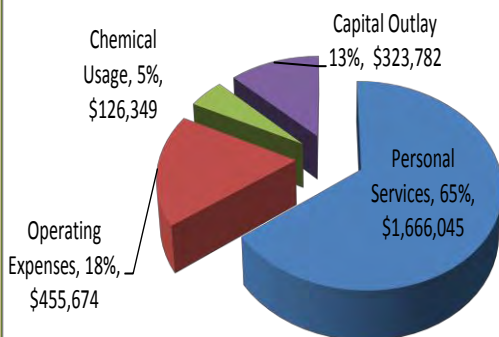


### 13/14 District Revenues Total \$2,667,479

Ad Valorem (real property) taxes, the primary source of revenue, comprised approximately 83% of totals. Due to an increase in property values, compared to prior years, the District levied a millage rate equal to the rolled back rate of .1312. The rolled-back rate is the aggregate millage rate that would generate the same level of tax revenue from the previous year. An inverse relationship exists, whereas property values increase the millage rate decreases to yield the same level of tax revenues. This enabled a lower rate of .1312 as compared to several prior years at .1325. Additionally, an atypically large source of revenue for the year was generated by the sale of the District's dormant Ponte Vedra property. This brought in gross proceeds of \$369,375 (13.8% of total revenues), netting a capital gain of \$351,008.



### 13/14 District Expenditures Total \$2,571,850



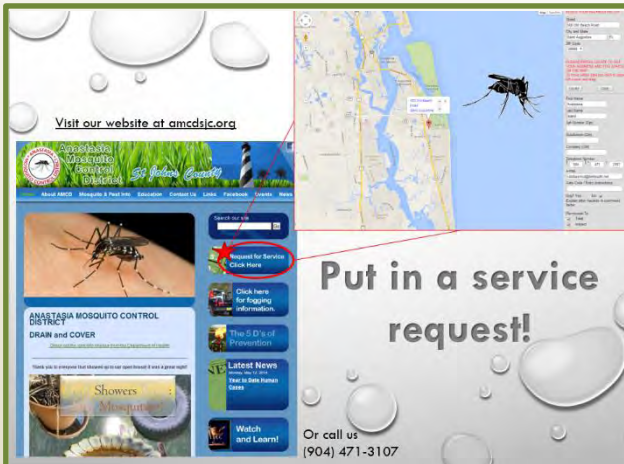
Expenditures for the year were comparatively less than revenues. This was attributed to the atypical sale of the Ponte Vedra property, and lower than anticipated expenditures, compared to the budget.

(i.e. – unnecessary aerial spraying \$200,000, retirement of two long-term employees, and directly correlated reduction of chemicals and benefits, respectively).

Additionally, there was a postponement on completion of the District's cutting edge, Capital Outlay Database project to be completed in the current Fiscal Year.

The Net difference between revenues and expenditures inherently yielded somewhat of a balanced budget.





During 2014 AMCD continued using the MapVision computer software program for customer service requests and fogging. The District also began working with Mobisoft on developing a more accessible service application and database software. St. Johns County residents continue to be able to check to see if their address was scheduled to be or had been fogged and to enter their own service requests via our website at [www.amcdsjc.org](http://www.amcdsjc.org).

AMCD answered 2,513 service requests in 2014 from local residents by phone, online through our website, by e-mail, fax, and walk-ins.

AMCD continued to provide service and educate residents on adult mosquitoes, larvae, fogging and/or spraying. Staff also dispensed information on pesticide safety, mosquitoes and other insect identification, pesticide applications, personal protection methods, mosquito prevention, commercial mosquito traps, repellents and insecticides, assisting residents with concerns about no spray areas, such as, bee keepers properties or personal conditions that warrant no spraying. Staff also assisted the public by distributing *Gambusia*, the mosquito larvae eating fish.



AMCD continues to follow Florida Statutes, Chapter 388, DAC's, 5E-13, EPA labels and MSDS sheets, and the District's procedures while providing necessary inspections, fogging and spraying.

### WEB PAGE:

We frequently updated our AMCD website in 2014 to keep our St. Johns County residents informed, as well as providing online service requests and fogging information. AMCD's website ([www.amcdsjc.org](http://www.amcdsjc.org)) continued to provide the following information: important links, public notices, meeting dates, illness advisories, training and workshop information, education opportunities, mosquito biology, and much more. AMCD is also active on Facebook and Twitter and hosts an online survey to determine customer satisfaction.





The Anastasia Mosquito Control District of St. Johns County (AMCD) works in cooperation with a number of related local, state, and federal agencies, private and commercial organizations, and members of the medical community. Those listed below briefly describe the work associations with AMCD in 2014 to prevent and control vector-borne diseases in Florida:

### **International Cooperation and Service:**

The Hebrew University of Jerusalem, Israel (Dr. Gunter Muller) about attractive toxic sugar baits, repellents and barrier treatment. Dr. Xue and Dr. Muller co-organized AMCA and SOVE symposium in 2014. Dr. Xue visited Turkey's field site in May.

Beijing Institute of Microbiology and Epidemiology (Dr. Tong-Yan Zhao & Dr. Chun-Xiao Li) about insecticide resistance, repellents, behavior, traps, and equipment evaluation.

Dr. Xue gave a lecture on IMM in Bamako University, Mali on January 2, 2014.

Dr. Xue gave a lecture on response and control of mosquito-borne diseases in Florida at Japan's National Institute of Infectious Diseases, Tokyo, July 17, 2014. Dr. Xue gave a presentation on ATSB at the 5th International Forum for Vector Management, Qingdao, Nov 3, 2014 during his vacation.

### **National and Federal Agencies & Associations:**

US Department of Agriculture / Center for Medical, Agricultural, and Veterinary Entomology. AMCD continued to cooperate with USDA/CMAVE to organize the 11<sup>th</sup> Arbovirus Surveillance and Mosquito Control Workshop and ATSB and trap projects.

Navy's Center for Entomological Excellence, Jacksonville, FL. AMCD continued to cooperate with NCEE for the barrier treatment machine and ULV sprayers evaluation.

Federal Bureau of Investigation. Dr. Xue continued to consult with the FBI agent about the outreach and prevention of bioterrorist threats.

Dr. Xue as Mosquito Research Foundation's research review committee member reviewed more than 50 grant applications.

Dr. Xue reviewed many manuscripts for the ESA's journals, AMCA's JAMCA, SOVE's JVE, Acta Tropic.

AMCA: AMCD is a sustaining member of the AMCA and AMCA/EPA's PESP member and provides an annual report. Dr. Xue organized a symposium about vegetation management for control of mosquitoes for the AMCA annual meeting. Dr. Xue, Ms. Jodi Scott gave several presentations at the AMCA meeting and reviewed and published manuscripts for the JAMCA. Dr. Xue was appointed as the Southeast Regional Director for the SOVE and organized behavioral ecology symposium for the SOVE annual meeting.

**NATIONAL AND FEDERAL AGENCIES & ASSOCIATIONS:** (Cont'd)

Two Commissioners and 3 staff attended FMCA's Tallahassee Legislation meeting, gave 7 presentations at the FMCA annual meeting. Commissioner Moeller was elected as the Commissioner Section Chair to serve the FMCA Board and Dr. Xue was elected as the Vice- President to serve the Board. Dr. Xue continues to serve the FMCA's Publication Committee and Mr. R. Weaver continues to serve the FMCA's Financial Committee, and Mrs. Moeller continues to serve the FMCA's Legislation Committee.

Dr. Xue attended the Florida Entomology Society (FES) meeting and was elected as the Vice-President for the FES and reviewed /published manuscripts in Florida Entomologist.

**STATE AGENCIES AND UNIVERSITIES:**

University of Florida, Department of Entomology and Nematology: AMCD cooperated with UF to train a Ph.D. student and a visiting scientist and continues the research on ATSB and its impact on non-targets funded by DACS and weather detection and database software development. AMCD continued with UF/FMEL, Vero Beach to conduct the DACS's grant about novel detection methods for arbovirus.

University of South Florida: AMCD continued to cooperate with USF about the Honey Card Project funded by DACS.

University of Miami: Dr. Xue continued to cooperate with UM to study the ATSB project.

DACS: AMCD renewed the Operations Contract with DACS. Dr. Xue serves their Research Committee to review about 20 grant applications. AMCD hosted the FCCMC meeting on February 11, 2014.

St. Johns County Department of Health (DOH): AMCD continued to cooperate with St. Johns County's DOH to conduct the surveillance of arbovirus and news releases about mosquito-borne diseases in St. Johns County and AMCD signed an agreement with St. Johns County's DOH about sharing the information about human cases of mosquito-borne diseases. Dr. Xue continues as a leadership council member to serve the St. Johns County DOH.

**COMPANIES AND OTHER DISTRICTS:**

AMCD continued to cooperate with: American LongRay to evaluate their new machines; All Pro to test their new formulation of adulticides; Korean Company to evaluate their new traps; and several other companies to evaluate their new traps and backpack sprayers. AMCD signed the Cooperation Agreement with Spring Star and Olfactory Lab to participate in their field projects. AMCD and Jacksonville Mosquito Control District shared our rotating traps for the mosquito population detection.



### LARVICIDES AND LARVICIDING:

The District primarily used Bti to kill larvae, then Methoprene products.

Mosquito Control Technicians and Inspectors treated 3,000 times on a total of 456,064.45 acres for larval control.



### SOURCE REDUCTION & BIOLOGICAL CONTROL:

491 used tires were collected and removed by AMCD Mosquito Control Technicians and Inspectors for source reduction. They emptied numerous containers in residential yards when they performed their inspections. AMCD provided mosquito feeding fish (Gambusia) for retention ponds and ditches 24 times.



### ADULTICIDES AND ADULTICIDING:

AMCD continued to use the Permethrin product (Aqualure 20-20) for ground ULV spraying. DUET was used for hand thermal fogging. Mosquitomist Two was used for salt marsh mosquito control. Also, barrier treatment was conducted several times in parks and special areas. Most of this was conducted for mosquito populations and WNV vector control. A total of 222,567.22 acres were treated 521 times for adulticide control.

### LARVICIDES AND ADULTICIDES USED IN 2014

LARVICIDES	AMOUNT USED	AREA TREATED	TIMES APPLIED
Altosid WSP	30,227.00 ea.	93.68 acres	427
Altosid XR	480.00 ea.	1.10 acres	22
Altosid XRG	4,662.00 lbs.	776.97 acres	338
Aquabac XT	1,218.94 gal.	455,098.17 acres	2054
Bti Briquets	302.00 ea.	0.69 acres	33
GB1111	61.55 gal.	20.51 acres	122
Sustain MBG	220.00 lbs.	73.33 acres	4
ADULTICIDES	AMOUNT USED	AREA TREATED	TIMES APPLIED
Aqualure 20-20	216.17 gal.	208,141.91 acres	213
Duet	122.09 gal.	12,603.99 acres	281
Mosquitomist Two	9.78 gal.	1,805.09 acres	5
Talstar P	5.66 gal.	16.23 acres	22



**MOSQUITO-BORNE DISEASES:**

AMCD cooperated with the Florida Department of Health to monitor imported mosquito-borne diseases through local health providers.



AMCD monitored West Nile Virus (WNV), Eastern Equine Encephalitis Virus (EEE), Saint Louis Encephalitis Virus (SLE), Highland James Virus (HJV) and California Group Virus, using 10 sentinel chicken sites around St. Johns County. In 2014, there were 3 imported human cases of Chikungunya and one blood donor who tested positive for WNV.

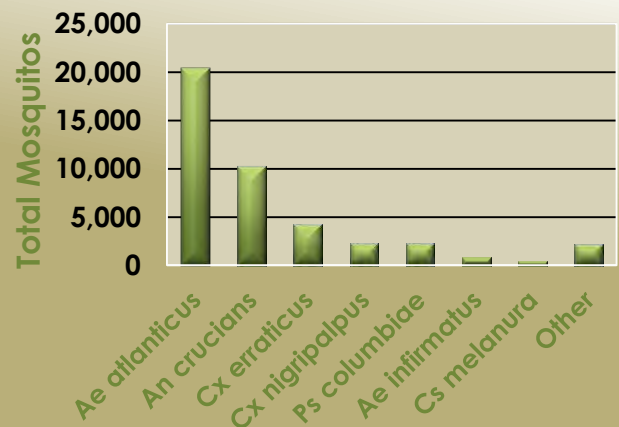
We bled chickens every Monday, from March to December and sent the blood samples to DOH's Arbovirus Laboratory in Tampa for testing.

In 2014, a total of 80 sentinel chickens tested positive for arboviruses, 7 for HJ, 24 for EEE, 48 for WNV, and 1 for Alphavirus.

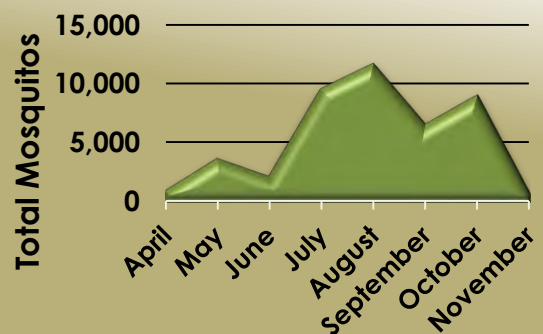
**MOSQUITO POPULATION:**

The adult mosquito population was monitored by 39 CDC light traps baited with Octenol from April to November, 2014. A total of 43,143 mosquitoes (31 species) were collected in 2014. Also, 6 BG traps, baited with BG Lure were used for *Aedes albopictus* and *Aedes aegypti* for a total of 7,702 mosquitoes (20 species) collected from May to November, 2014. A total of 50,845 mosquitoes were trapped by both methods.

A larval survey was conducted by dipping every Tuesday and Thursday and irregular times, a total of 65,253 dips were conducted and 8,099 dips were positive with 24,888 larvae found.

**2014 Yearly Totals by Species****ENVIRONMENTAL PARAMETERS:**

Rainfalls were monitored by 61 rain gauges and the tides were monitored by two (2) tide gauges at the Base Station three (3) times a week.

**2014 CDC Light Trap - Octenol**



### Detection of EEE & WNV by sentinel chickens and honey cards in St. Johns County, Florida

Sentinel chickens have been used to detect arboviruses in St. Johns County for the past 25 years; however, the sentinel chickens' sample results have a time-lag which may add to a loss of early detection and response time to treat those mosquitoes which may be positive. Finding a faster and more economical detection method to detect arboviruses transmitted by mosquitos is critical for impacting the vector population during the peak window mosquito season. Honey-coated nucleic-acid preserving substrates were used in this study in order to capture the viruses in 5 sentinel chicken sites in St. Johns County. The study was a part of a USF/UF's FDACs grant. By mid-October, 20 EEE, 30 WN, and 7 HJ positive chickens have been confirmed by the sentinel chicken detection, and 14 EEE and 1 WNV have been confirmed by the honey card in St. Johns County.

### Evaluation of ATSB mixed with mosquito attractants against adult mosquitoes

Increasing the attraction of ATSBs for container breeding mosquitoes through the addition of adult mosquito lures may increase their efficacy and control. The objectives of the project were to increase the attraction of *Aedes albopictus* to ATSBs, determine the levels of attraction of ASB, ATSB, and ATSB plus attractants with laboratory reared adult *Aedes aegypti* and *Aedes albopictus*, and evaluate efficacy of ATSB + lure to control adult mosquitoes. The attraction of ATSB + attractant as well as mortality of adult container breeding mosquitoes through laboratory mortality bioassays and olfactometer evaluations.

### Field comparison of two commercial battery powered backpack sprayers and one pump up sprayer against caged adult *Aedes aegypti* mosquitoes with an adulticide at different dilutions, orange oil and PBO.

AMCD currently uses the hand pump sprayer model #425 by Solo for application of the adulticide Aqualure for mosquito control. Evaluating different sprayers for mosquito control ensures their efficacy, safety, low costs, and durability necessary for staff and the taxpayers of St Johns County. Finding the lowest concentration of active ingredient with the highest efficacy can reduce the amount of chemicals into the environment that mosquito control personnel, as well as homeowners, put out when controlling vectors and pests. The objectives were to evaluate three backpack sprayers, their efficacy, and coverage through spraying caged mosquitoes in the field with the adulticide Aqualure at different dilutions as well as Orange oil and PBO, determine the physical characteristics of the Birchmeier and Hudson electric backpack sprayers, evaluate costs vs. durability vs. ease of use vs. safety.







## ATSB non-target DACS grant

The correlation between foliage diversity and non-target arthropods was assessed through simulated Attractive Toxic Sugar Bait treatments. Dyed Attractive Sugar Bait (no active ingredient) was applied to two 150 m sites each comprised of different foliage diversity. Treatments were assessed by multiple types of collection devices up to 24 h post application. The sites were treated two times and the data was pooled between both treatments. The site with greater foliage diversity had the highest number of arthropods collected while the lowest number that consumed the bait (3%). The least diverse site had the highest percent of consumed (16%) while the least amount of arthropods collected.

## ThermaCELL mortality evaluation against multiple wild caught mosquitoes

The ThermaCELL is marketed as a mosquito repellent with allethrin as the active ingredient. AMCD evaluated the product's ability to kill wild caught SJC mosquitoes within close proximity to the machine. There were statistically significant differences when comparing the treatments and controls for the pooled species both for knockdown and 24 hour mortality data. From highest 24 hour mortality to lowest: *Ae. atlanticus*, *Ps. ferox*, *Ps. columbiae*, and *Oc. taeniorhynchus*. These experiments suggest ThermaCELL is not only a powerful repellent, but also is successful in creating high mortality in multiple species of wild mosquitoes in within 10 feet of the units.

## Weather monitoring devices against caged adult *Aedes aegypti* and DUET both NEAT and 50/50

Testing at St Johns County Fairgrounds has been a part of an ongoing collaboration and project with the University of Florida Engineering Department who have been developing weather stations which will be able to transmit microclimate data remotely to Mosquito Control Technicians and/or Researchers. We used the adulticide DUET, both NEAT and 50/50, to simulate how a fogging may travel throughout a large area. We utilized adult caged USDA mosquitoes at each of the weather stations in order to find possible correlations between microclimate data and mosquito mortality after being exposed to the adulticide.

## APPLIED RESEARCH PROJECTS 2014

Oral toxicity ATSB <i>Ae. albo</i> DACS grant	ATSB Barrier Treatment Wild mosquito Pop Dacs Grant
Evaluation of oil based pupicides	Blood feeding <i>Ps. howardii</i>
Novel detection DACS grant	ThermaCELL Eval
ATSB Choice Tests DACS grant	Nozzle angle field test with ULV
ATSB + pyriproxyfen Plant Wash <i>Codiaeum petra</i>	Residential treatments against <i>Aedes albopictus</i>
Resistance management with <i>Aedes albopictus</i>	Semi field evaluation of larvacides
ATSB + lure laboratory and olfactometer	ASB + Orange Oil (0.1% & 1%) against <i>Aedes aegypti</i>
Backpack sprayer evaluations	ATSB vs. Sucrose <i>Culex quinq</i>
ATSB + pyriproxyfen fecundity	Semi Field test of ATSB + lure
ATSB + Poly Control Mortality Exp DACS grant	Weather monitoring devices and fogging
ATSB non-target DACS grant	Topical application of malathion & permethrin on wild <i>albos</i> 4 rez
New ATSB and stable & house flies	<i>Aedes aegypti</i> wild collection for genetic testing by CMAVE
ATSB applied to <i>Coleus solenostemon</i> DACS grant	Semi-Field Test ATSB + Poly Control-2 <i>Ae. albopictus</i>
Powerbreeze evaluation	BG sentinel trapping for <i>Aedes albo</i> and <i>aegypti</i>
<i>Ae. taenies</i> survival on salt marsh plants	



## COMMUNITY EVENTS/PUBLIC OUTREACH:

In 2014, AMCD staff participated in and presented information at 44 community events and public outreach programs (76% increase over 2013). Next year, the AMCD Education Program hopes to streamline educational material to be more accessible to broader audiences.



## EDUCATION/SCHOOL PROGRAMS:

AMCD currently has routine programs for Kindergarten, 5th and 7th grade that are being taught within the St. Johns County public school system. Other curricula are developed per situation based on the intellectual capacity of students and the needs of the target classroom.

Education Specialist, Christopher Bibbs, along with other AMCD staff, employ a variety of teaching methods and hands-on science based labs to educate students on mosquito biology, ecology, control & prevention. Each lesson is aligned with Florida's Next Generation Sunshine State Standards. In 2014 AMCD taught at 15 different Public schools throughout St. Johns County and reached approximately 1,520 students. The participating schools included the following Elementary Schools: RB Hunt, Otis Mason, Durbin Creek, Wards Creek, Palencia, Julington Creek, St. Paul's, Hartley, Osceola, and South Woods; Middle Schools: Landrum and Cathedral Parish; High Schools: St. Augustine and St. Johns. Next year, the AMCD Education Program hopes to design permanent curricula that reach even more grade levels.

## PUBLIC RELATIONS:

The AMCD was featured in 26 dedicated newspaper articles, 9 television news broadcast segments, and 5 radio interviews, totaling 40 media highlights during 2014.



## 2014 CUSTOMER SATISFACTION SURVEY RESULTS

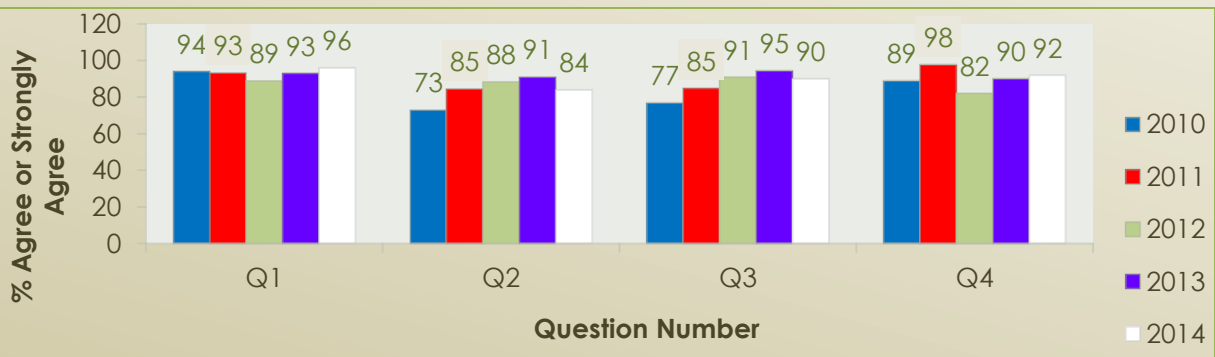
AMCD continues to gauge customer satisfaction using physical door hangers and internet surveys. For 2014 there were 149 physical surveys returned and 76 internet surveys returned, for a total of 225 returned surveys (90% increase from 2013).

The data was combined and then compared. The graph below represents the percent of customers who overall agree to each of the following questions:

### Question

- # 1 - The goal of AMCD is to preserve and protect the community from mosquitoes and mosquito-borne diseases by reducing nuisance and disease spreading mosquito populations.
- # 2 - AMCD staff is informative and professional.
- # 3 - AMCD responds to my service requests within the standard 1-2 business days.
- # 4 - I am aware of and actively participate in DRAIN and COVER methods.

These results show that in 2014 AMCD maintained high overall scores with substantially more feedback over previous years.



### AMCD EMPLOYEE CONTINUING EDUCATION & TRAINING COURSES

Biomedical, FEMA, Fire Safety, PPE, Universal Waste, Heat Illness; Labels & MSDS, Hazardous Communication, Sexual Harassment, Diversity, Safety Manual, VCMS & Pocket PC's, Chemical Spill Control, Biobottle Resistance Assays, Tick Disease and I.D., Arbovirus surveillance, Salt Marsh Management.





**BOARD BUSINESS:** AMCD staff provided many documents to Board members and the attorney for Board and Committee meetings in 2014 and supported 14 Board meetings.

**INVENTORY:** The annual physical inventory, monthly tire inventory, and chemical inventory were done regularly. Two trucks, two fuel tanks, and other items were surplus in 2014.

**INSURANCE:** The Board renewed the dental, life, health, as well as fleet insurances.

**BUDGET:** AMCD increased the millage rate to 0.2450 for FY 14/15 to assist in building a new Base Station facility and in prevention and control of possible Chikungunya and Dengue Fever outbreaks in order to protect the citizens and to assist in operating within a balanced budget. The millage rate had been lowered to 0.1312 for FY 13/14, from 0.1325, where it had been for the past several years.

**POLICIES:** Staff continued updating the District's Policy Manual, Employee Handbook, and the Commissioner's Handbook in 2014 as policies were changed or added, including the new Mission, Values, Vision, & Programs.

**PERSONNEL:** Biologist, Alice Fulcher resigned her position November 28, 2014; Jodi Scott resigned her position as Education Specialist May 30, 2014 to join the Navy and continues to work at AMCD as a visiting scientist/Ph.D. student for two years; Christopher Bibbs was hired as the new Education Specialist on June 2, 2014. Jennifer Gibson, an intern at AMCD, moved into a grant funded position, then was promoted as a full-time Biological Technician October 20, 2014; Emily Thomson worked at AMCD in a grant funded position, then was promoted to a



seasonal Inspector Sprayer, then promoted to a full-time Biological Technician on October 20, 2014; Michael Vaughn and Barry Scott were promoted from seasonal Inspector Sprayers to full-time Mosquito Control Technicians on March 3, 2014. David Taylor, North and South Station Supervisor retired on June 20, 2014 and Mosquito Control Technicians' Greg Griggs, retired from the Base Station on June 30, 2014 and Ryan Grubbs, resigned from the North Station on September 26, 2014. Nine seasonal employees worked for AMCD

from May to October. Two intern students worked for three months from the end of May to the end of August, and three intern students worked for 6 months during the summer.

**RECOGNITION/AWARDS:** Commissioners' Jeanne Moeller and Catherine Brandhorst were re-elected to another four (4) year term in November. Commissioner Moeller was elected as the FMCA's Commissioner Chairperson. Dr. Rui-De Xue received the FMCA's merit award at the FMCA annual meeting in Weston, FL, and was also elected as the Vice-President for the FES in August and for the FMCA in November. Dr. Xue was also appointed as the Southeast Regional Director for the SOVE in September 2014. The following AMCD personnel received awards for their years of service with the District: Vincent Price for 15 years; Mike Smith for 30 years; and Kay Gaines received a Managements Choice Award for her contributions to the AMCD District throughout the year.



**CONTRACTS:** The Board renewed several annual contracts and approved a business agreement between AMCD and the St. Johns County Health Department. AMCD occupied the chemical storage building on our EOC Drive property, and sold the Ponte Vedra property in May 2014. The RFP for the new Base Station Complex project, approved by the Board in 2014, was awarded to Harrell Construction.



## PROFESSIONAL MEETINGS, SYMPOSIUMS, AND WORKSHOPS

### Organized and attended by AMCD staff and Commissioners:

**Jan. 20-24:** Commissioners' J. Moeller, C. Brandhorst, G. Howell, J. Bequette and 6 employees attended the FMCA Dodd Short Course, Ocala, FL.

**Feb 3-6:** Commissioners J. Moeller, V. Browning, and Director RD Xue, and Visiting Scientist/Ph.D. student J. Scott attended the AMCA annual meeting, Seattle, WA. Dr. RD Xue organized a symposium titled "Vegetation Management and ATSB for Biting Fly Control".

**Feb. 11:** Dr. RD Xue and several staff attended the FCCMC meeting which we hosted.

**Feb. 18-20:** Dr. RD Xue attended the California Mosquito and Vector Control Association meeting, San Diego, CA.

**March 6:** Dr. RD Xue and Mr. S. Hanna attended an employment workshop, St. Augustine, FL.

**Mar. 17-18:** Commissioners' J. Moeller and G. Howell, Director Dr. RD Xue, and Biologist Mrs. A. Fulcher attended the FMCA Tallahassee Legislation meeting.

**Mar. 25-27:** AMCD organized the 11th Arbovirus Surveillance and Mosquito Control Workshop.

**April 16:** Dr. RD Xue attended the DACS workshop, Pasco County Mosquito Control District.

**May 5-7:** Commissioner J. Moeller attended the AMCA Legislation Meeting, Washington DC. .

**May 14:** Commissioner J. Moeller, Director Dr. RD Xue, Supervisor K. Gaines, and Data Manager R. Weaver attended the Volusia Mosquito Control Technological meeting.

**Jun. 2-4:** Commissioner J. Moeller and Dr. RD Xue attended the UF/FMEL Dengue and Chikungunya Response meeting, Ft. Pierce, FL.

**Jul. 15-18:** Dr. RD Xue attended the Kiwanis International Congress and visited the National Institute of Infectious Diseases, Tokyo, Japan.

**Aug. 4-6:** Dr. RD Xue attended the Florida Entomology Society meeting, Jupiter, FL.

**Sep. 4:** Dr. RD Xue attended the DACS Research Committee meeting, USDA, Gainesville, FL.

**Sep. 22-23:** Dr. RD Xue, Mike Smith, and Derrick Conover, attended the Navy workshop, Jacksonville, FL.

**Sep. 29-Oct 2:** Dr. RD Xue attended the SOVE annual meeting and organized a symposium titled "Behavioral Ecology".

**Nov. 3-5:** Dr. RD Xue attended the 5th International Forum for Sustainable Vector Management, Qingdao during his vacation.

**Nov. 10-12:** Commissioners' J. Moeller and V. Browning, Director RD Xue, and 5 other staff attended the FMCA annual meeting, Weston, FL.



**JAN 2:** Seminar at MRTC/FMPOS, University of Sciences, Techniques and Technology of Bamako, Mali. Dr. RD Xue gave a lecture on Best Management Practices for Integrated Mosquito Management.

**FEB 2-6:** The AMCA 80th Annual meeting, Seattle, WA. Dr. RD Xue, Overview of Vegetation and Mosquito Relationship. Dr. RD Xue, Evaluation of ATSB Mixed with Pyriproxyfen Sprayed on Plants Against Container-inhabiting Mosquitoes *Aedes albopictus*. J. Scott, Laboratory Evaluation of Citronella, Picaridin, and DEET Repellents against *Psorophora ciliata* and *Ps. howardii*.

**FEB 18-20:** The California Mosquito And Vector Control Association meeting, San Diego, CA. Dr. RD Xue, ATSB and IGRs Against Adult and Larval *Aedes albopictus*.

**MAR 25-27:** The 11th Arbovirus Surveillance and Mosquito Control Workshop, AMCD, St. Augustine, FL. Dr. RD Xue, Mosquitoes and Plants-The principle and Use of Plants in Mosquito Control. R Weaver, Analysis of sentinel chickens and arbovirus in St. Johns County. A. Fulcher, Evaluation of Mosquiron CRD Against *Culex quinquefasciatus* in Downtown Storm Drains, St. Augustine, FL. J Scott, Primarily Testing and Formulations of an Attractive Targeted Sugar Bait Against *Aedes aegypti* and *Aedes albopictus*. A Fulcher, Hand Thermal Fogging Comparison Study. E Thomson, Oral Toxicity of Dish Detergent in Adult *Aedes aegypti*. Dr. RD Xue, ATSB and Pyriproxyfen on Plants Against Adult and Larval *Aedes albopictus*. M Smith, Large Scale Evaluation of a New Barrier Spray Machine and Barrier Treatment. K Gaines, Early Population Outbreak of Mosquitoes and Control Response in St. Johns County, FL.

**JULY 17:** Seminar at the National Institute of Infectious Diseases, Tokyo, Japan. Dr. RD Xue gave a lecture on Response and Control of Dengue and Chikungunya Vectors in Florida.

**AUG. 6:** The Florida Entomological Society meeting, Jupiter, FL. Dr. RD Xue, Barrier Spray and Barrier Machine Against Adult Mosquitoes.

**AUG. 15:** Intern student project reports and seminar at AMCD, St. Augustine, FL. J Scott, Power Breeze Misting Citronella Oil Against *Aedes albopictus*. D Conover, Evaluation of 3 Backpack Sprayers Against *Aedes aegypti*. C Anderson, Sublethal Impact of Pyriproxyfen against Mosquitoes. K Seeger, ATSB Mixed with Attractants to Increase attraction and Mortality. D Dixon, Physiological Study on Mosquito Middle Guts After Blood Meals.

**SEP 22-23:** Navy workshop. D Conover, Evaluation of 3 Backpack Sprayers Against Mosquitoes.

**SEP. 29-OCT. 2:** The 45th Annual SOVE Conference, San Antonio, Tx. Dr. RD Xue, Evaluation of Power Breeze with Citronella Oil Against *Aedes albopictus*. Dr. RD Xue, Blood Feeding Behavior of Large *Psorophora* Mosquitoes.

**Nov. 3-5:** The 5th International Forum for Sustainable Vector Management, Qingdao, China. Dr. RD Xue, Thermal Fogging and Barrier Spraying Against Mosquitoes. Dr. RD Xue, ATSB and the IGRs Against Larval and Adult Mosquitoes.

**Nov. 9-12:** The 86th FMCA Annual Meeting, Weston, FL. R Weaver, New Database Software with Smart Phone for AMCD Operation. J Gibson, Detection of Arbovirus by Sentinel Chickens and a Novel Surveillance System in St. Johns County, FL. Dr. RD Xue, Evaluation of Power Breeze and Misting Citronella Oil Against *Aedes albopictus*. K Gaines, Evaluation of 3 Backpack Sprayers Against *Aedes aegypti*. M Smith, A New Barrier Machine with a High Penetration to Spray Bifenthiion Against Adult Mosquitoes. Dr. RD Xue, Thermal Fogging and Barrier Spraying Benefit Adult Mosquito Control Program at AMCD. C Bibbs, Spatial Repellent Mosquito Control Device Causing Knockdown, Morbidity, and Mortality.





1. Qualls, WA, Muller, GC, Revay, EE, Allan, SA, Arheart, KL, Beier, JC, Smith, ML, Scott, JM, Kravchenko, VD, Hausmann A, Yefremova, ZA, Xue, RD. 2014. Attractive Toxic Sugar Baits (ATSB) – Barrier for Control of Vector and Nuisance Mosquitoes and its Effect on Non-target Organisms in Sub-tropical Environments in Florida, USA. *Acta Tropica* 131:104-110.
2. Revay, EE, Muller, GC, Qualls, WA, Kline, DL, Naranjo, DP, Arheart, KL, Kravchenko, VD, Yefremova, ZA, Hausmann, A, Beier, JC, Schlein, Y, Xue, RD. 2014. Control of *Aedes albopictus* with Attractive Toxic Sugar Baits (ATSB) and Potential Impact on Non-target Organisms in St. Augustine, FL. *Parasitol Res* 113:73-79.
3. Zhu, L, Fulcher, A, Hossain, T, Davidson, C, Beier, JC, Xue, RD. 2014. Body Size, Blood Feeding Activity and Fecundity of *Psorophora howardii*, *Psorophora ciliata*, and *Psorophora ferox* (Diptera: Culicidae). *Journal of Medical Entomology* 51:382-386.
4. Barnard, DR, Dickerson, CZ, Murugan, K, Xue, RD, Kline, DL, and Bernier, UR, 2014. Measurement of Landing Mosquito Density on Humans. *Acta Tropica* 136:58-67.
5. Mdoe, FP, Nkwengulila, G, Chobu, M, Lyaruu, L, Gyunda, IL, Mbepera, S, Xue, RD, Kweka, EJ. 2014. Larvicidal Effect of Disinfectant Soap on *Anopheles gambiae* s.s (Diptera: Culicidae) in Laboratory and Semifield Environs. *Parasites & Vectors*, 7:211.
6. Priya, S, Murugan, K, Priya, A, Dinesh, D, Panneerselvam, C, Devi, GD, Chandramohan, B, Kumar, PM, Barnard, DR, Xue, RD, Hwang, JS, Nicoletti, M, Chandrasekar, R, Amsath, A, Bhagooli, R, Wei, H. 2014. Green Synthesis of Silver Nanoparticles Using *Calotropis gigantea* and Their Potential Mosquito Larvicidal Property. *International Journal of Pure and Applied Zoology* 2:128-137.
7. Scott, JM, Hossain, T, Davidson C, Smith, ML, Xue, RD. 2014. Laboratory Evaluation of Citronella, Picardin and Deet Repellents Against *Psorophora ciliata* and *Psorophora howardii*. *JAMCA* 30:136-137.
8. Xue, RD, Debboun, M. 2014. Fatigue from Multiple Host-seeking Activity in *Aedes albopictus* and its Effects on Blood-feeding Behavior and Deet Repellency. *JAMCA* 30:116-118.
9. Fulcher, A, Scott, JM, Qualls, WA, Muller, GC, Xue, RD. 2014. Attractive Toxic Sugar Baits Mixed with Pyriproxyfen Sprayed on Plants Against Adult and Larval *Aedes albopictus* (Diptera: Culicidae). *JME* 51:896-899.
10. Naranjo, DP, Qualls, WA, Jurado, H, Perez, J, Xue, RD, Gomez, E, Beier, JC. 2014. Vector Control Programs in Saint Johns County, Florida and Guayas, Ecuador: Successes and Barriers to Integrated Vector Management. *BMC: Public Health* 14:674.
11. Wu, TP, Hu, Q, Zhao, TY, Tian, JH, Xue, RD. 2014. Morphological Studies of *Culex molestus* of *Culex pipiens* Complex (Diptera: Culicidae) in Underground Parking Lots in Wuhan, Central China. *Florida Entomologist* 97:1191-1198.
12. Hossain, TT, Fulcher, A, Davidson, C, Beier, JC, Xue, RD. 2014. Evaluation of Boric Acid Sugar Baits Sprayed on Plants Against the Salt Marsh Mosquito *Aedes taeniorhynchus* (Diptera: Culicidae). *Florida Entomologist* 97:1865-1868.
13. Wang, SQ, Li, YC, Zhang, ZM, Wang, GZ, Hu, XM, Qualls, WA, Xue, RD. 2014. Prevention Measures and Soci-economic Development Result in a Decrease in Malaria in Hainan, China. *Malaria Journal* 13:362.
14. Doud, CW, Hanley, A, Chilaire, K, Richardson, A, Britch, S, Xue, RD. 2014. Truck-mounted Area Wide Application of Pyriproxyfen Targeting *Aedes aegypti* and *Aedes albopictus* in Northeast Florida. *JAMCA* 30:291-297.
15. Xue, RD, Zhao, TY, Li, CX, Dong, YD, Wu, MY, Zhou, MH, Ni, CM, Walton, W, Brown, D. 2014. The 3rd International Forum for Surveillance and Control of Mosquitoes and Mosquito-borne Diseases. *Wing Beats* 25:25-27.
16. Xue, RD. 2014. Sugar baits incorporated with boric acid and pyriproxyfen against *Aedes albopictus*. *Proceedings and papers of the Mosquito and Vector Control Association of California*, 82:92-93.
17. Xue, RD, Gaines, MK, Moeller, JJ, Clark, GG, Kline, DL, Linthicum, KJ. 2014. 11 years of learning at the Anastasia Mosquito Control District's Arbovirus Surveillance and Mosquito Control Workshop. *Wing Beats* 25:32-33.



## ANNUAL PROGRAM REPORT COMMITTEE MEMBERS



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## IN APPRECIATION

We would like to thank all residents of St. Johns County for their support, as well as the AMCD Board of Commissioners, the District's attorney and CPA, all employees, colleagues, and all contractors, cooperative organizations, and agencies for their help in 2014.